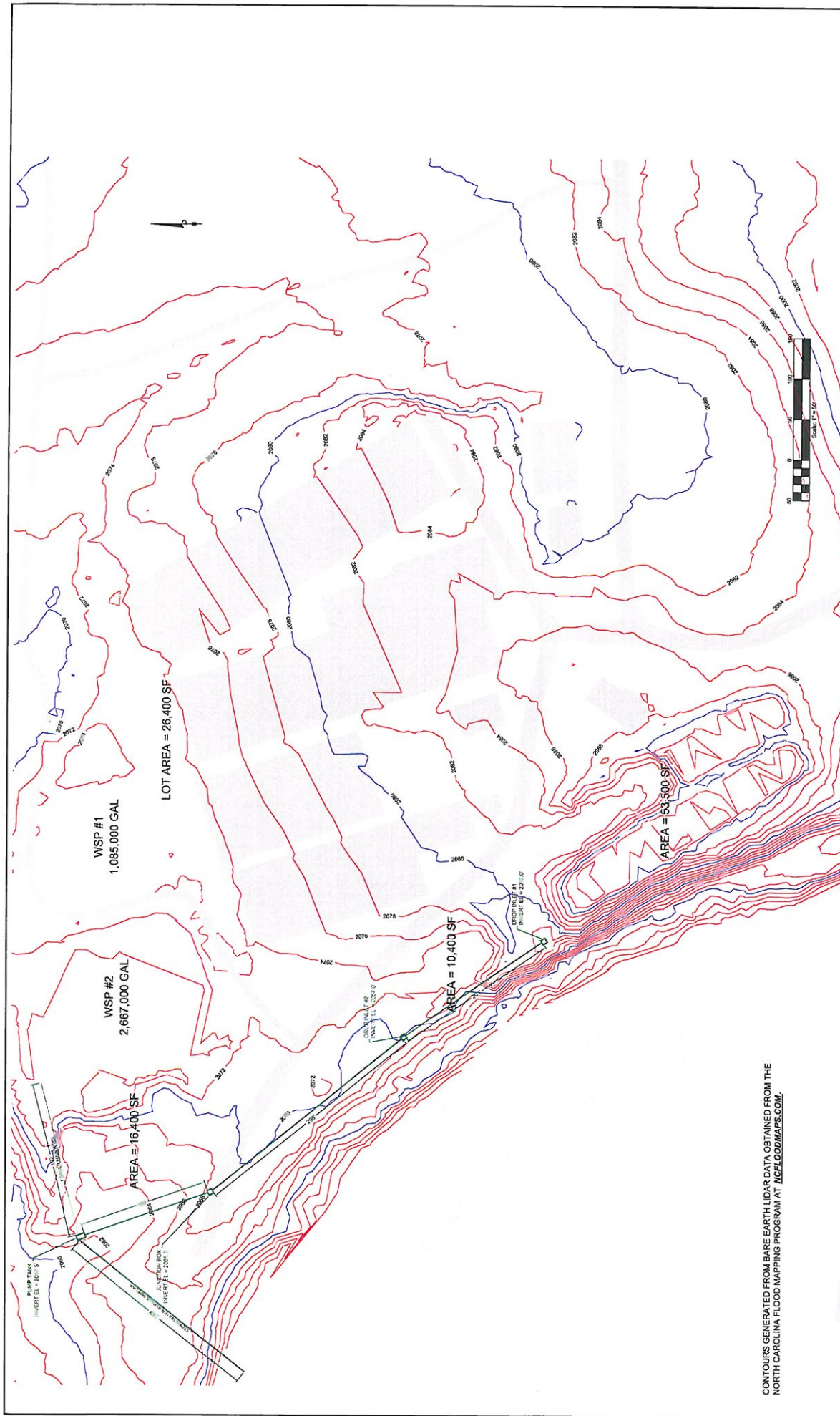


**Taproot Dairy, Henderson County, NC - March 5, 2103**

	Area (sf)	Rainfall (Jan - Mar) (in)	25-yr, 24-hr Storm Precipitation (in)	90-Day Wastewater Volume (cf)	Storm Volume (cf)
Feedlot, Scrape Lane(s), Unroofed Areas	26,400	11.26	5.94	24,772	13,068
Waste Storage Pond #1	19,200	11.26	5.94	18,016	9,504
Waste Storage Pond #2	42,300	11.26	5.94	39,692	20,939
Silos, #1 & #2	53,500	11.26	5.94	50,201	26,483
Silo, #3	10,400	11.26	5.94	9,759	5,148
90-day Storage Requirement				142,439	Storm Requirement 75,141

	# of Animals (hd)	Daily Volume (cf)	Storage Period (days)	Total (cf)
Manure Production, Holstein Cows	800	1.82	90	131,040
Wasted Bedding, Sand/Sawdust	800	0.3	90	21,600
Tank & Pipeline Sanitation		100	90	9,023
Heat Exchanger/Plate Cooler Water		722	90	64,965
90-day Storage Requirement				226,627
TOTAL STORAGE REQUIREMENT				444,207

Volume of Waste Storage Pond #1 (cf)	344,810	<i>Determined by prismoidal formula using areas at surface, midpoint, &amp; bottom (does not include structural freeboard)</i>
Volume of Waste Storage Pond #2 (cf)	140,958	
Total Volume Available (cf) =	485,768	



CONTOURS GENERATED FROM BARE EARTH LIDAR DATA OBTAINED FROM THE  
NORTH CAROLINA FLOOD MAPPING PROGRAM AT [NCFLOODMAPS.COM](http://NCFLOODMAPS.COM).



PROJECT #:	Taproot_dairy	SCALE:	1 INCH = 50 FEET
DRAWN BY:	J. YOUNG	DATE:	FEBRUARY 19, 2013
CHECKED BY:		DATE:	
SHEET NO.	1 OF 1	FILENAME:	shdwsp_2013.dwg

NO.	REV.	DATE	DESCRIPTION
1			
2			
3			
4			
5			

# SILAGE LEACHATE COLLECTION SYSTEM TAPROOT DAIRY - SITE PLAN HENDERSON COUNTY, NORTH CAROLINA



STATE OF NORTH CAROLINA  
DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES  
DIVISION OF SOIL AND WATER CONSERVATION  
WESTERN HEADQUARTERS  
1331 FARMING BRIDGE ROAD FLETCHER, NC 28728  
PHONE: (828) 597-2697

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# **ANIMAL WASTE MANAGEMENT PLAN FOR TAPROOT DAIRY**

**FACILITY:** #45-02  
**OWNER:** Taproot Dairy Farm, LLC  
**ADDRESS:** 208 Butler Bridge Road  
Fletcher, North Carolina 28732  
**LATITUDE:** N 35° 24' 30"  
**LONGITUDE:** W 82° 31' 50"  
**TELEPHONE:** (828) 684-4617

## **GENERAL**

The animal waste management system for Taproot Dairy was planned and designed at the request and with the involvement the owner and operators. The plan is based on choices made by them. The system is planned to manage waste generated by the dairy in a manner that prevents degradation of soil, water, air, plant, and animal resources and protects public health and safety. It is also planned prevent any discharge of pollutants to surface water from a 25-year, 24-hour storm event, to minimize ground water contamination, and to recycle the waste produced through soil and crops to the fullest extent possible.

The animal waste management system has six distinct functions. These functions are production, collection, transfer, storage, treatment, and utilization. Each of these functions is involved in the system planned for Taproot Dairy. The operation, maintenance, and safety requirements for the system presented in this plan are organized by these functions.

## **SYSTEM DESCRIPTION**

The animal waste management system was planned to accommodate waste from a herd of 1250 Holstein dairy livestock and wastewater from the milk parlor and milk house. The system is planned to divert clean water from the system with roof gutters and downspouts, to collect the manure from the freestall barn with flush alleys in a reception pit, to treat the wastewater with a solid/liquid separator, to store manure and wastewater in two waste storage ponds, to transfer the wastewater in a pipeline from the waste storage pond to fields where it can be land applied, and to utilize the waste on additional acreage of cropland not contiguous with the dairy facility.

## **OWNER'S / OPERATORS' RESPONSIBILITIES**

The owner and operators are responsible for the proper installation, operation, and maintenance of the waste management system. Although the system was designed by

the Natural Resources Conservation Service, NC Division of Soil and Water Conservation, and the Henderson Soil and Water Conservation District using the best available technology, it needs to be inspected and properly operated and maintained in a safe manner if it is to operate as planned and designed.

As required by North Carolina General Statute 90-47, the owner of the dairy must designate an "operator in charge" for the waste management system. The operator in charge must hold a current valid certificate to operate a Type B animal waste management system and have primary responsibility for the operation of the system.

Taproot Dairy is also responsible for obtaining a general permit from the NC Division of Water Quality to operate the system. The system must be operated and maintained in accordance with the permit as well as any other local laws and ordinances. All personnel must be trained or informed of the safety and the operation and maintenance requirements of the system.

An inventory of equipment related to each function will be made and checklists developed, as necessary, for preventive maintenance and inspection. A supply of spare parts necessary to keep the system operating will be kept on hand. Nameplate data, reference manuals, catalogs, drawings, and other manufacturers' information necessary to operate and maintain the equipment used in the system will be kept. Records will be kept of run times, amount of waste applied, fields receiving waste, soil analyses, waste analyses (liquid and solid), and the type of crop receiving waste.

## **SYSTEM COMPONENTS**

The animal waste management system consists of the following components:

- Freestall alley flushing system
- Agpro® Extractor manure separator
- Separated manure storage pad
- Wastewater lift station
- Primary waste storage pond (140,000 ft<sup>3</sup>)
- Secondary waste storage pond (340,000 ft<sup>3</sup>)
- Underground irrigation hydrant system
- Hard hose irrigation traveler
- PTO-driven slurry irrigation pump
- PTO-driven agitation pump
- Solid manure spreader

## **WASTE PRODUCTION**

The system's capacity was based on a waste production estimates from 1250 Holstein dairy livestock weighing approximately 1300 pounds each. Exceeding either the number or type of livestock may invalidate the design for the system and therefore

jeopardize the general permit issuance. The system was based on daily manure production of 2438 ft<sup>3</sup> and wastewater production of 835 ft<sup>3</sup> per day from the milk parlor and milk house. Additional wastewater is generated as a result of rain falling on the pond surfaces and on approximately 30,000 square feet of concrete used for cattle movement and manure storage. This additional wastewater was estimated to be approximately 64,230 ft<sup>3</sup> during the storage period (70 days). Rainfall as a result of the 25-year, 24-hour storm event contributed another 48,000 ft<sup>3</sup> to the storage volume estimates.

The system was designed assuming roof water would be excluded from the system. For this reason the roof gutter and downspout system on the barns must be maintained. The storm water pipes and diversions that uncontaminated runoff away from the farm must be maintained as well. Gutters, downspouts, pipes, and diversions will be inspected during storm events to check for leaks or blockages. If found, repairs must be made immediately.

Safety concerns with waste production include maintaining ventilation to prevent the buildup of gases within the freestall barn. Workers must be informed of the danger of gases and the necessity of keeping vents open at all times, even during cold weather.

## **WASTE COLLECTION**

Waste collection pertains to the capture and gathering of manure and wastewater so it can be further managed. Manure is collected from a freestall barn with flush alleys. Temporary storage is provided in the concrete collection ditch before the separator processes the flush water. Flush water used in the system is recycled from the secondary waste storage pond. Flush tanks are filled using an automated supply pump and underground pipeline. The pump enclosure will be maintained to prevent exposure to the elements. Pump maintenance will be according to the manufacturer's recommendations. Pump safety features will be maintained. The flushing operation will be monitored for effectiveness in moving the manure to the collection ditch. The frequency and/or duration of flushing will be adjusted as necessary.

All grates and barriers for the collection ditch must remain secured in place except for maintenance purposes. During maintenance, temporary barriers must be positioned to prevent accidental entry. To prevent injury, caution shall be exercised when flush valves are operated.

## **WASTE TREATMENT**

The treatment of animal waste pertains to changing the characteristics of the waste by biological, chemical, or physical means. Manure and wastewater from the flush alleys will be treated with a stationary, inclined-screen solid/liquid separator prior to discharge into the primary waste storage pond. Wastewater passing through the separator and drainage from the stockpiles of solid manure will drain into an underground, concrete reservoir where they will be pumped automatically to the primary waste storage pond. Wastewater from the milk parlor and milk house flows directly into the secondary waste

storage pond. Separated solids will be stored on an adjacent concrete pad. Manure will be flushed from the freestall alleys at least once a day.

The rate of flow to the separator must be within the range recommended by the manufacturer. The flow must be adjusted for maximum solid separation efficiency. The screen will be given a clean-water rinse following each use to prevent solids from drying and adhering to the screen. All waste treatment equipment shall be operated and maintained in accordance with the manufacturers' recommendations.

## WASTE STORAGE

The storage components for the system are two waste storage ponds and a concrete slab for storage of separated solids. The primary waste storage pond was designed for a capacity of 140,000 ft<sup>3</sup>. The secondary waste storage pond stores approximately 340,000 ft<sup>3</sup> and is sufficient to store all liquid waste, contaminated runoff and rainfall for a period of seventy (70) days. It is also the source of recycled wastewater used for flushing the freestall barn. The primary waste storage pond is connected to the secondary waste storage pond by a pipe spillway and is utilized for additional solid waste separation. Both waste storage ponds shall maintain a minimum freeboard of 1.0 feet.

The concrete slab is approximately 24 feet wide and 100 feet long. It is capable of storing separated manure from the freestall flushwater for approximately 30 days. A concrete push-wall along one side of the slab helps facilitate loading of the waste with a front-end loader. Runoff from the stored manure is collected in a concrete drop box and transferred automatically to the primary waste storage pond.

The secondary waste storage pond must be nearly empty at the beginning of the corn-growing season (April 1). Additional applications of wastewater on the corn crop should be made whenever possible before the corn grows too tall for the irrigation equipment. The pond should fill to a level not to exceed two (2.0) feet below the dam by early July. Removal of liquids before the end of the storage period may be necessary if above average precipitation has occurred and if future storms that may cause the pond to overflow are possible. Liquid must be removed to the extent necessary to allow for storage of these potential storm events. Normal applications of liquid must persist throughout the late summer and fall. Applications to small grain cover crops may take place through the month of November. The secondary waste storage pond should be empty by December since receiving crops will no longer be growing during winter months.

A safety fence should be installed and maintained around the ponds. Entrance inside the fence must only be by those who are trained and have activities to perform. A hazard sign should be displayed and kept in good condition. A boat and/or life ring is recommended to be placed near the pumping location for emergency rescues.

The vegetative cover within the pond shall be maintained by monthly mowing during the growing season. Weeds and woody vegetation will be controlled with herbicides, which must be applied according to label instructions.

The pond shall be inspected at least annually and after unusual storm events. The embankment will be inspected for leaks, slope failures, erosion, and excessive settlement. Excavated slopes will be inspected for slope failures and erosion. Repairs shall be made promptly. Assistance in planning the appropriate repairs may be requested from the Henderson Soil and Water Conservation District and USDA-Natural Resources Conservation Service.

The concrete slab for storage of separated solids will be inspected for cracking, and repairs will be made as necessary. Drains to the waste storage pond will be inspected regularly to see that they are operative.

## **WASTE TRANSFER**

Transfer refers to movement and transport of the waste throughout the system. Waste is pumped from the waste storage pond and transferred for land application using a 8-inch pipeline that is buried. Along the pipeline, irrigation hydrants are located in surrounding fields. Valves, air vents and other pipeline appurtenances will be inspected for proper operation prior to using the pipeline. All hydrants will be clearly marked and protected against damage from tillage and other types of equipment. To prevent solids accumulation, it will be flushed with clean water following each use. The pump and irrigation traveler must be operated and maintained according to the manufacturer's instructions. The pipeline, pump and traveler will be drained at the end of the fall season to prevent cold weather damage.

Separated solids will be transferred using a solid manure spreader. The manure spreader must be maintained according to the manufacturer's recommendations. Equipment operated on public roads must have signs as required by local laws and regulations. Care shall be taken to minimize spillage on the roadways.

## **WASTE UTILIZATION**

Waste utilization is the part of the system that recycles reusable waste products. Wastewater from the waste storage pond and separated solids will be uniformly surface applied to surrounding cropland. The liquids will be applied using the irrigation traveler and the solids will be applied using a manure spreader. Manure and wastewater will be applied only on actively growing crops when the weather forecast is a high probability of 7 days without precipitation.

The nutrients available in the waste must not exceed the agronomic requirements for the yield goals of the crops. The actual rates applied will be based on the nutrient content of the waste and soil fertility testing.

Refer to the WASTE UTILIZATION PLAN prepared for the farm by USDA-Natural Resources Conservation Service and the Henderson Soil and Water Conservation District for application rates, scheduling and record keeping requirements.

The guidelines below should be followed when applying animal waste. Animal waste shall **not** be applied:

- \* to wetlands or surface water or shall not reach wetlands or surface waters of the state by runoff, drift, manmade conveyances, direct application, or direct discharge during operation or land application. Proper application rate and method shall be used to ensure that these specifications are met.
- \* on land eroding at less than 5 tons per acre per year. Waste may be applied to land that is eroding at 5 or more tons but less than 10 tons per acre per year providing grass filter strips are installed where runoff leaves the field.
- \* to saturated soils, during rainfall events, or when the surface is frozen. When animal waste is to be applied on areas subject to flooding, it will be soil incorporated on conventionally tilled crops or grassland; the waste may be broadcast provided the application does not occur during a season prone to flooding.
- \* more than 30 days prior to planting of the crop or forages breaking dormancy. A suitable cover crop should be planted to scavenge nutrients especially on leachable soils. Also on soils with a high potential for leaching, multiple applications at lower rates should be used.
- \* closer than 25 feet to perennial waters.
- \* closer than 100 feet to wells.
- \* within 200 feet of dwellings other than those owned by the landowner.
- \* in a manner to reach other property and public right-of -ways.

Animal waste applied on grassed waterways shall be at agronomic rates and in a manner that causes no runoff or drift from the site.

Apply animal waste at rates that do not exceed the nitrogen needs for realistic yield expectation (R.Y.E.) for the crop being grown.

Waste shall be tested within 60 days of utilization and soil shall be tested at least annually at crop sites where waste products are applied. Nitrogen shall be the rate-determining element. Zinc and copper levels in the soil shall be monitored and alternative crop sites shall be used when these metals approach excess levels. The pH shall be adjusted for optimum crop production and maintained. Evaluations of the soil analysis should consider concentration of elements to assess potential toxicity or whether increased concentrations of one element have reduced the availability of another element to plants. Plant tissue analysis is recommended to evaluate nutrient status and confirm that nitrogen is not excessive. Soil test and waste analysis records shall be kept for 5 years.

Liquid waste shall be applied at rates not to exceed the soil infiltration rate. No ponding shall occur.

Records of waste application shall be maintained to establish actual application rates. The record will include date of application, amount of waste applied per acre by tract number and field number, most recent waste analysis and soil test report, and the realistic yield expectation nitrogen rate. Waste application records shall be maintained for 5 years.

Use a method of spreading that will result in uniform application of waste at specified rates when operating the truck-mounted, liquid manure spreader or the solid manure spreader.

Animal waste should be applied on actively growing crops in such a manner that the crop is not covered with waste to a depth that would inhibit growth. The potential for salt damage from animal waste should be considered also.

Odors can be reduced by injecting the waste into the soil or disking after waste application. Waste should not be applied when there is danger of drift from the irrigation field.

Samples should be taken of groundwater and surface water from areas where animal waste is routinely applied. Samples should be analyzed for nutrients and bacteria.

Round bales of hay should be removed from waste application fields within 1 year to prevent the reintroduction of nutrients into the environment.

Animal waste may be used on crops grown for human consumption, but it should only be applied before planting with no further applications of animal waste during the crop season.

## **OPERATION AND MAINTENANCE**

The PTO-driven irrigation pump shall be operated and maintained in accordance with the manufacturer's recommendations and operator's manual. A copy of the manual must be inserted with this plan and kept on site for reference during operation. The following guidelines should be observed when operating the pump:

- \* All guards, safety shields and covers shall be installed and maintained as directed by the manufacturer.
- \* Keep children and unauthorized personnel away from the equipment; never allow them to operate it.
- \* Barriers shall be installed to prevent either people or animals from falling into the ponds.
- \* Keep hands, feet and loose clothing away from power driven parts.
- \* Make certain everyone is clear of equipment before operating.

- \* **Never** allow the level of wastewater in the ponds to encroach on the minimum freeboard of twelve (12) inches.

The following directions should be followed when operating solid/liquid manure separator:

- \* Never enter the wastewater lift station when the concrete tank contains waste. Storage of waste in the structure will generate gases such as methane, hydrogen sulfide, carbon dioxide and ammonia. The accumulation of gases may cause injury or death.
- \* Never introduce a spark in or around the concrete structure. The gases can create an explosive environment.
- \* Keep children and unauthorized personnel away from the tank and equipment; never allow them to operate it.
- \* Do not leave ladders where an unauthorized person or persons could climb the separator.
- \* Never operate or maintain the separator while under the influence of drugs, alcohol or any medication, which could impair judgment or motor skills.
- \* Keep hands, feet and loose clothing away from power driven parts.
- \* Make certain everyone is clear of equipment before operating.

A vigorous stand of vegetation shall be maintained on the dam. Grass provides a surface that can easily be inspected and maintained. Trees and brush are not permitted to grow on the dam or in the emergency spillway. Their deep root systems provide paths for water to travel, and uprooted trees create large holes weakening the dam. Brush also creates difficulty when inspecting the surface of the dam. Elimination of trees and brush will lessen the chances that burrowing animals will reside in the dam. Vegetation on the dam shall be mowed at least annually to prevent the growth of woody plants. Grass on the dam shall not be mowed at a height less than four (4) inches. Exclude livestock from the dam with fencing. Livestock are not permitted to graze the vegetation at any time since they can damage the vegetation and create ruts, holes and bare spots.

Inspect the dam periodically, especially after significant rainfall events, for signs of erosion. Rills and gullies shall be filled with suitable soil, compacted and reseeded as soon as possible. Gullies left unrepaired may cause more serious damage to the dam, threatening the entire structure.

Regularly inspect the downstream face of the dam for seepage. Signs of seepage include wet areas and springlike flows. Presence of wetland plants like cattail and bulrush may also be a sign of seepage. Seepage must be repaired as soon as possible.

by installing an upstream blanket or other approved method. Consult the Henderson Soil and Water Conservation District for the appropriate repair method.

The dam must be closely inspected for cracks (transverse and longitudinal). Cracks wider than one fourth (0.25) inch wide or well-defined cracks indicate serious problems. Traverse cracks indicate differential settlement along the dam and provide a path for seepage. Longitudinal cracks along the dam may be the first sign of a slide or slump. All cracks shall be repaired immediately by placing clay in compacted layers in the crack. All repairs must be monitored frequently to determine if the dam is continuing to settle, slide or slump. Consult the Henderson Soil and Water Conservation District for additional repair procedures.

Inspect the dam for burrows by rodents such as groundhogs, woodchucks and muskrats. Backfill any burrows by mud-packing with a mixture of earth, cement and water. A section of stove pipe is typically placed over the burrow entrance and a thin slurry (nine parts dirt, one part cement and water) is poured into the pipe. The entrance is plugged with compacted fill and reseeded. All burrows shall be eliminated without delay because a single burrow can cause the dam to fail.

Regularly inspect the dam for sink holes, misalignments along the dam and boils. These conditions are indications of a potential failure and require immediate action. Follow the instructions outlined in the EMERGENCY ACTION PLAN contained within this document.

## **EMERGENCY ACTION PLAN**

### **If the dam is failing or appears to be rapidly approaching failure . . .**

1. Contact State of North Carolina Department of Environment and Natural Resources - Division of Water Quality - Asheville Regional Office  
Phone: (828) 251-6208  
Hours: 8:00am - 5:00pm Monday through Friday

If outside normal business hours:

Contact State of North Carolina Department of Crime Control and Public Safety - Division of Emergency Management - Raleigh  
Phone: (800) 662-7956 Environmental Emergency Hotline

If there is danger to human life, downstream residences, roads, etc. . . .

Call 911 or the Henderson County Sheriff's Department

2. Begin lowering the liquid level in the pond by applying the waste water to surrounding irrigation fields.
3. Contact a contractor to begin repair (list the names and phone numbers below)

NAME

PHONE NUMBER

1.     \*\*Dairy will use their own equipment!\*\*
- 2.
- 3.
4.     Contact the Henderson Soil and Water Conservation District.  
Phone: (828) 697-4949
5.     Contact the technical specialist who certified the waste storage pond.

Jeff Young, PE - [Jeff.Young@ncagr.gov](mailto:Jeff.Young@ncagr.gov)  
NC Department of Agriculture and Consumer Services  
Division of Soil and Water Conservation  
Western Headquarters  
1301 Fanning Bridge Road  
Fletcher, NC 28732  
Tel: 828-687-6987

OR

USDA-NRCS Civil Engineer  
Second Broad River Watershed Office - Rutherfordton  
Phone: (828) 287-5462

OR

Area 1 Engineer  
USDA - Natural Resources Conservation Service  
Waynesville Area Office  
Phone: (828) 456-6341

**Taproot Dairy  
Waste Management System  
Pond Volume Calculations**

Prepared by: Jeff Young, PE  
NCDA&CS – DSWC  
November 5, 2013

**Waste Storage Pond #2**

**A** = Area @ TOP = 42,730 square feet

**B** = Area @ MID-DEPTH = 32,200 square feet

**C** = Area @ BOTTOM = 22,930 square feet

**D** = Depth = 11 feet

**V** =  $[(A + 4B + C)/6] \times D$

$V = \{[42,730\text{sf} + 4(32,200\text{ sf}) + 22,930\text{ sf}]/6\} \times 11\text{ ft}$

$V = [(42,730\text{sf} + 128,800\text{ sf} + 22,930\text{ sf})/6] \times 11\text{ ft}$

$V = (194,460\text{ sf}/6) \times 11\text{ ft}$

$V = 32,410\text{ sf} \times 11\text{ ft}$

$V = 356,510\text{ cf}$

$V = 2,667,000\text{ gal}$

**Waste Storage Pond #1**

**A** = Area @ TOP = 19,200 square feet

**B** = Area @ MID-DEPTH = 14,400 square feet

**C** = Area @ BOTTOM = 10,250 square feet

**D** = Depth = 10 feet

**V** =  $[(A + 4B + C)/6] \times D$

$V = \{[19,200\text{sf} + 4(14,400\text{ sf}) + 10,250\text{ sf}]/6\} \times 10\text{ ft}$

$V = [(19,200\text{sf} + 57,600\text{ sf} + 10,250\text{ sf})/6] \times 10\text{ ft}$

$V = (87,050\text{ sf}/6) \times 10\text{ ft}$

$V = 14,508\text{ sf} \times 10\text{ ft}$

$V = 145,080\text{ cf}$

$V = 1,085,000\text{ gal}$

# EMERGENCY ACTION PLAN

## PHONE NUMBERS

DWQ (828) 296-4500  
EMERGENCY MANAGEMENT SYSTEM 911  
SWCD (828) 697-4949  
NRCS (828) 693-1629 x3

This plan will be implemented in the event that wastes from your operation are leaking, overflowing, or running off site. You should not wait until wastes reach surface waters or leave your property to consider that you have a problem. You should make every effort to ensure that this does not happen. This plan should be posted in an accessible location for all employees at the facility. The following are some action items you should take.

1. Stop the release of wastes. Depending on the situation, this may or may not be possible. Suggested responses to some possible problems are listed below.

A. Lagoon overflow-possible solutions are:

- a. Add soil to berm to increase elevation of dam.
- b. Pump wastes to fields at an acceptable rate.
- c. Stop all flows to the lagoon immediately.
- d. Call a pumping contractor.
- e. Make sure no surface water is entering lagoon.

B. Runoff from waste application field-actions include:

- a. Immediately stop waste application.
- b. Create a temporary diversion to contain waste.
- c. Incorporate waste to reduce runoff.
- d. Evaluate and eliminate the reason(s) that caused the runoff.
- e. Evaluate the application rates for the fields where runoff occurred.

C. Leakage from the waste pipes and sprinklers-action include:

- a. Stop recycle pump.
- b. Stop irrigation pump.
- c. Close valves to eliminate further discharge.
- d. Repair all leaks prior to restarting pumps.

D. Leakage from flush systems, houses, solid separators-action include:

- a. Stop recycle pump.
- b. Stop irrigation pump.
- c. Make sure no siphon occurs.
- d. Stop all flows in the house, flush systems, or solid separators.
- e. Repair all leaks prior to restarting pumps.

E. Leakage from base or sidewall of lagoon. Often this is seepage as opposed to

- a. Dig a small sump or ditch away from the embankment to catch all seepage, put in a submersible pump, and pump back to the lagoon.
- b. If holes are caused by burrowing animals, trap or remove animals and fill holes and compact with a clay type soil.
- c. Have a professional evaluate the condition of the side walls and lagoon bottom as soon as possible.

2. Assess the extent of the spill and note any obvious damages.

- a. Did the waste reach any surface waters?
- b. Approximately how much was released and for what duration?
- c. Any damage noted, such as employee injury, fish kills, or property damage?
- d. Did the spill leave the property?
- e. Does the spill have the potential to reach surface waters?
- f. Could a future rain event cause the spill to reach surface waters?
- g. Are potable water wells in danger (either on or off of the property)?
- h. How much reached surface waters?

3. Contact appropriate agencies.

- a. During normal business hours, call your DWQ (Division of Water Quality) regional office; Phone ~~888-296-4500~~. After hours, emergency number: 919-733-3942. Your phone call should include: your name, facility, telephone number, the details of the incident from item 2 above, the exact location of the facility, the location or direction of movement of the spill, weather and wind conditions. The corrective measures that have been under taken, and the seriousness of the situation.
- b. If spill leaves property or enters surface waters, call local EMS phone number ~~911~~.
- c. Instruct EMS to contact local Health Department.
- d. Contact CES, phone number ~~888-697-4871~~, local SWCD office phone number ~~888-697-4871~~ and local NRCS office for advice/technical assistance phone number ~~888-697-4871~~ x 3

4. If none of the above works call 911 or the Sheriff's Department and explain your problem to them and ask that person to contact the proper agencies for you.

5. Contact the contractor of your choice to begin repair of problem to minimize off-site damage.

a. Contractors Name: \_\_\_\_\_  
b. Contractors Address: \_\_\_\_\_  
c. Contractors Phone: \_\_\_\_\_

6. Contact the technical specialist who certified the lagoon (NRCS, Consulting Engineer, etc).

a. Name: Jeff Young, PE  
b. Phone: (828) 687-6987

7. Implement procedures as advised by DWQ and technical assistance agencies to rectify the damage, repair the system, and reassess the waste management plan to keep problems with release of wastes from happening again.

## Insect Control Checklist for Animal Operations

Source	Cause	BMPs to Minimize Insects	Site Specific Practices
<b>Liquid Systems</b>			
Flush Gutters	● Accumulation of Solids	<input type="checkbox"/> Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed;	
		<input type="checkbox"/> Remove bridging of accumulated solids at discharge	
Lagoons and Pits	● Crusted Solids	<input checked="" type="checkbox"/> Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6 - 8 inches over more than 30% of surface.	
Excessive Vegetative Growth	● Decaying vegetation	<input checked="" type="checkbox"/> Maintain vegetative control along banks of lagoons and other impoundments to prevent accumulation of decaying vegetative matter along water's edge on impoundment's perimeter.	
<b>Dry Systems</b>			
Feeders	● Feed Spillage	<input type="checkbox"/> Design, operate and maintain feed systems (e.g., bunkers and troughs) to minimize the accumulation of decaying wastage. <input checked="" type="checkbox"/> Clean up spillage on a routine basis (e.g., 7 - 10 day interval during summer; 15-30 day interval during winter).	
Feed Storage	● Accumulation of feed residues	<input type="checkbox"/> Reduce moisture accumulation within and around immediate perimeter of feed storage areas by insuring drainage away from site and/or providing adequate containment (e.g., covered bin for brewer's grain and similar high moisture grain products) for and remove or break up accumulated solids in filter strips around feed storage as needed.	

Source	Cause	BMPs to Minimize Insects	Site Specific Practices
Animal Holding Areas	● Accumulations of animal wastes and feed wastage	<input checked="" type="checkbox"/> Eliminate low areas that trap moisture along fences and other locations where waste accumulates and disturbance by animals is minimal. <input type="checkbox"/> Maintain fence rows and filter strips around animal holding areas to minimize accumulations of wastes (i.e. inspect for and remove or break up accumulated solids as needed).	
Dry Manure Handling Systems	● Accumulations of animal wastes	<input checked="" type="checkbox"/> Remove spillage on a routine basis (e.g., 7-10 day interval during summer; 15-30 day interval during winter) where manure is loaded for land application or disposal. <input checked="" type="checkbox"/> Provide adequate drainage around manure stockpiles. <input checked="" type="checkbox"/> Inspect for an remove or break up accumulated wastes in filter strips around stockpiles and manure handling areas as needed.	

For more information contact the Cooperative Extension Service, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613

# Dairy Farm Waste Management Odor Control Checklist

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
Farmstead	● Dairy Production	<input checked="" type="checkbox"/> Vegetative or wooded buffers; <input checked="" type="checkbox"/> Recommended best management practices; <input checked="" type="checkbox"/> Good judgement and common sense	
Paved lots or barn alley surfaces	● Wet manure-covered surfaces	<input checked="" type="checkbox"/> Scrape or flush daily; <input checked="" type="checkbox"/> Promote drying with proper ventilation; <input checked="" type="checkbox"/> Routine checks and maintenance on waterers, hydrants, pipes, stock tanks	
Bedded areas	● Urine; ● Partial microbial decomposition	<input checked="" type="checkbox"/> Promote drying with proper ventilation; <input checked="" type="checkbox"/> Replace wet or manure-covered bedding	
Manure dry stacks	● Partial microbial decomposition	<input checked="" type="checkbox"/> Provide liquid drainage for stored manure	
Storage tank or basin surface	● Partial microbial decomposition; ● Mixing while filling; ● Agitation while emptying	<input type="checkbox"/> Bottom or mid-level loading; <input type="checkbox"/> Tank covers; <input type="checkbox"/> Basin surface mats of solids; <input checked="" type="checkbox"/> Minimize lot runoff and liquid additions; <input checked="" type="checkbox"/> Agitate only prior to manure removal; <input type="checkbox"/> Proven biological additives or oxidants	
Settling basin surfaces	● Partial microbial decomposition; ● Mixing while filling; ● Agitation while emptying	<input checked="" type="checkbox"/> Liquid drainage from settled solids; <input checked="" type="checkbox"/> Remove solids regularly	
Manure, slurry, or sludge spreader outlets	● Agitation when spreading; ● Volatile gas emissions	<input type="checkbox"/> Soil injection of slurry/sludges; <input checked="" type="checkbox"/> Wash residual manure from spreader after use; <input type="checkbox"/> Proven biological additives or oxidants	
Uncovered manure, slurry or sludge on field surfaces	● Volatile gas emissions while drying	<input type="checkbox"/> Soil injection of slurry/sludges; <input checked="" type="checkbox"/> Soil incorporation within 48 hrs; <input checked="" type="checkbox"/> Spread in thin uniform layers for rapid drying; <input type="checkbox"/> Proven biological additives or oxidants	
Flush tanks	● Agitation of recycled lagoon liquid while tanks are filling	<input type="checkbox"/> Flush tank covers; <input type="checkbox"/> Extend fill lines to near bottom of tanks with anti-siphon vents	
Outside drain collection or	● Agitation during wastewater	<input type="checkbox"/> Box covers	

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
junction boxes	conveyance		
Lift stations	<ul style="list-style-type: none"> <li>● Agitation during sump tank filling and drawdown</li> </ul>	<input type="checkbox"/> Sump tank covers	
End of drain pipes at lagoon	<ul style="list-style-type: none"> <li>● Agitation during wastewater conveyance</li> </ul>	<input type="checkbox"/> Extend discharge point of pipes underneath lagoon liquid level	
Lagoon surfaces	<ul style="list-style-type: none"> <li>● Volatile gas emission;</li> <li>● Biological mixing;</li> <li>● Agitation</li> </ul>	<input checked="" type="checkbox"/> Proper lagoon liquid capacity; <input checked="" type="checkbox"/> Correct lagoon startup procedures; <input type="checkbox"/> Minimum surface area-to-volume ratio; <input checked="" type="checkbox"/> Minimum agitation when pumping; <input checked="" type="checkbox"/> Mechanical aeration; <input type="checkbox"/> Proven biological additives	
Irrigation sprinkler nozzles	<ul style="list-style-type: none"> <li>● High pressure agitation;</li> <li>● Wind drift</li> </ul>	<input checked="" type="checkbox"/> Irrigate on dry days with little or no wind; <input checked="" type="checkbox"/> Minimum recommended operating pressure; <input type="checkbox"/> Pump intake near lagoon liquid surface; <input type="checkbox"/> Pump from second stage lagoon; <input checked="" type="checkbox"/> Flush residual manure from pipes at end of slurry/sludge pumpings	
Dead animals	<ul style="list-style-type: none"> <li>● Carcass decomposition</li> </ul>	<input checked="" type="checkbox"/> Proper disposition of carcasses	
Standing water around facilities	<ul style="list-style-type: none"> <li>● Improper drainage;</li> <li>● Microbial decomposition of organic matter</li> </ul>	<input checked="" type="checkbox"/> Grade and landscape such that water drains away from facilities	
Mud tracked onto public roads from farm access	<ul style="list-style-type: none"> <li>● Poorly maintained access roads</li> </ul>	<input checked="" type="checkbox"/> Farm access road maintenance	

Additional Information:

Cattle Manure Management; 0200 Rule/BMP Packet  
 Dairy Educational Unit Manure Management System - Lake Wheeler Road Filed Laboratory; EBAE 209-95  
 Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-83  
 Management of Dairy Wastewater; EBAE 106-83  
 Calibration of Manure and Wastewater Application Equipment; EBAE Fact Sheet  
 Nuisance Concerns in Animal Manure Management: Odors and Flies; PRO107, 1995 Conference Proceedings

Available From:

NCSU, County Extension Center  
 NCSU - BAE  
 NCSU - BAE  
 NCSU - BAE  
 NCSU - BAE  
 Florida Cooperative Extension

## **Mortality Management Methods**

(check which method(s) are being implemented)

- ☒ Burial three feet beneath the surface of the ground within 24 hours after knowledge of the death. The burial must be at least 300 feet from any flowing stream or public body of water.
- ☒ Rendering at a rendering plant licensed under G.S. 106-168.7.
- ☐ Complete incineration
- ☐ In the case of dead poultry only, placing in a disposal pit of a size and design approved by the Department of Agriculture.
- ☒ Any method which in the professional opinion of the State Veterinarian would make possible the salvage of part of a dead animal's value without endangering human or animal health. (Written approval of the State Veterinarian must be attached)

December 18, 1996